

We Claim:

1. A process for expanding at least one partially cross-linked blank which is intended to form, in the cross-linked, expanded state, all or part of an elastomeric safety support of cellular structure having closed cells, said support being intended to be mounted on a wheel rim within a tire, comprising

curing said or each blank in a bath of fluid at excess pressure which is contained in an enclosure, the temperature of said bath having a maximum value of between 110°C and 210°C, and the absolute pressure of said bath having at least a value equal to or greater than 5 bar and a final pressure-relief value substantially equal to 1 bar, for expanding said or each blank such that the increase in volume thereof is unlimited with respect to said enclosure.

2. An expansion process according to Claim 1, including varying, discretely or continuously, said absolute pressure of said fluid between a maximum value less than or equal to 26 bar and a value less than said maximum value.

3. An expansion process according to Claim 1, including using a liquid fluid for curing said or each blank.

4. An expansion process according to Claim 1 including using a gaseous fluid for curing said or each blank.

5. An expansion process according to Claim 1, including cooling said bath to a temperature less than or equal to 100°C and at an absolute pressure of between 1 and 26 bar, following the curing of said or each blank.

6. An expansion process according to Claim 1, including curing in said bath a plurality of blanks of linear and/or curved forms.

7. A process for cross-linking and expanding at least one cross-linkable, expandable blank which is intended to form, in the cross-linked, expanded state, all or part of an elastomeric safety support of cellular structure having closed cells, said support being intended to be mounted on a wheel rim within a tire, in which

said cross-linking includes curing said or each expandable or expanded blank in a bath of fluid at excess pressure which is contained in an enclosure, such that said or each blank interacts with said bath independently of said enclosure, the temperature of said bath having a maximum value of between 110°C and 210°C, and the absolute pressure of said bath having at least a value equal to or greater than 14 bar, and

- said expansion includes subjecting said or each cross-linkable or cross-linked blank to an expansion process according to Claim 1.

8. A cross-linking and expansion process according to Claim 7, characterized in that it includes:

- in a first step, subjecting said or each cross-linkable, expandable blank to said cross-linking in order to obtain a practically cross-linked, expandable blank, then
- in a second step, subjecting said or each blank which is practically cross-linked and expandable following said first stage of said expansion, in order to obtain all or part of said corresponding cross-linked, expanded safety support.

9. A cross-linking and expansion process according to Claim 7, characterized in that it includes:

- in a first step, subjecting said or each cross-linkable, expandable blank to said expansion in order to obtain a cross-linkable, practically expanded blank, then
- in a second step, subjecting said or each blank which is cross-linkable and practically expanded to said cross-linking, in order to obtain all or part of said corresponding cross-linked, expanded safety support.

10. A curing device for implementing the cross-linking and expansion process according to Claim 7, the device comprising an enclosure which is provided with at least one opening for the introduction and extraction of said or each blank, means for receiving said or

each blank, means for filling said enclosure with liquid or gaseous fluid, and heating and

pressurization means for the fluid contained within said enclosure,

characterized in that said enclosure comprises:

- an introduction compartment provided at its inlet with an opening for introducing into said compartment a unit of cross-linkable, expandable blanks for the curing thereof, said introduction opening being provided with a means for closing it,

- a curing compartment provided downstream of said introduction compartment and provided at its inlet with a first mobile partition for allowing it to communicate with said introduction compartment, said curing compartment being intended to contain said heated, pressurized fluid in order to obtain a unit of cross-linked, expandable blanks, and

- an extraction compartment downstream of said curing compartment and provided at its inlet with a second mobile partition for allowing it to communicate with said curing compartment and at its outlet with an opening to atmospheric pressure for extracting a unit of cross-linked, expanded blanks from said enclosure, said extraction opening being provided with a means for closing it, and

- means for alternately transferring said fluid at excess pressure from said extraction compartment towards said introduction compartment, and from said introduction compartment towards said extraction compartment.

11. A curing device for implementing the cross-linking and expansion process according to Claim 7, the device comprising an enclosure which is provided with means for the
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introduction and extraction of said or each blank, a means for receiving said or each blank, means for filling said enclosure with liquid or gaseous fluid, and heating and pressurization means for the fluid contained within said enclosure,

characterized in that said enclosure is provided with a plurality of receiving means mounted adjacent each other on a conduit intended for filling said enclosure with fluid and extending into the interior thereof.

12. A curing device according to Claim 11, characterized in that said enclosure comprises an outlet conduit connected to means for circulating said fluid to said means for filling the enclosure.

13. A curing device for implementing the cross-linking and expansion process according to Claim 7, the device comprising an enclosure which is provided with at least one opening for the introduction and extraction of said or each blank, means for receiving said or each blank, means for filling said enclosure with liquid or gaseous fluid, and heating and pressurization means for the fluid contained within said enclosure, characterized in that

- said means for filling the enclosure are formed of a conduit opening into an opening in said enclosure, said conduit being provided with a means which slides hermetically on an inner face of a wall of said conduit for pressurizing the fluid contained within said enclosure, this conduit also permitting emptying of said enclosure, and

- in that said means for heating said fluid are mounted around said enclosure and said conduit.

14. A safety support for a tire or section of said support obtained by a process according to Claim 7, said support or said section being formed of a cross-linked, expanded rubber composition having a cellular structure having closed cells, said support being intended to be mounted on a wheel rim within a tire, characterized in that it comprises, radially towards the inside of its outer surface, an intermediate layer, the thickness of which is between 5% and 30% of the smallest dimension of a cross-section through said section and a core and in which the density of the intermediate layer is less than that of the core.

15. A support or section of said support according to Claim 14, characterized in that it has a maximum density in a surface layer at the location of its outer surface, radially to the outside of said intermediate layer.

16. A support or section of said support according to Claim 14, characterized in that it has an average density of between 0.04 and 0.4.

17. A support or section of said support according to Claim 16, characterized in that it has an average density substantially equal to 0.13.

18. A support or section of said support according to Claim 14, characterized in that the respective diameters of said cells vary on average from 0.1 mm to 2 mm over a cross-section of said support or section.

19. A support or section of said support according to Claim 14, characterized in that it consists of one or more blanks each of which are based on a copolymer of isoprene and isobutylene.

20. A support or section of said support according to Claim 14, characterized in that it comprises, as reinforcing filler, a blend of 10 to 30 phr silica and 10 to 30 phr carbon black (phr: parts by weight per hundred parts of elastomer(s)).

21. A support or section of said support according to Claim 14, comprising a base intended to be mounted on a wheel rim and a crown intended to bear on the tread of said tire following a drop in pressure within the tire, characterized in that it has at least one longitudinal groove extending over said crown substantially level with the latter, in the direction of the length of said support or section of support.

22. A support or section of said support according to Claim 14, characterized in that it has at least one longitudinal cutout in its mass, which extends in the direction of the length of said support or section of support.

23. A support according to Claim 14, characterized in that it is substantially in the form of a torus.

24. A section of a support according to Claim 14, characterized in that it is substantially in the form of a portion of a torus.

25. A section of a support according to Claim 14, characterized in that it is substantially of linear form.